A systematic review of frames in news reporting of health risks: Characteristics, construct consistency vs. name diversity, and the relationship of frames to framing functions

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A systematic review of frames in news reporting of health risks: Characteristics, construct consistency vs. name diversity, and the relationship of frames to framing functions

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Risk professionals and scholars have long recognised the media as a key player in the social construction of risk. Many investigations into the frames journalists use when covering risks were published in recent years. Yet, keeping track of this literature has become increasingly difficult because authors tend to introduce new frames with every new study. This study reports a systematic review of studies on news frames on health risks. We pursue three central aims: (1) to determine if some of the frame-names circulating in the literature stand for very similar or even identical constructs (and can thus be condensed); (2) to determine how they relate to the four framing functions and to each other; and (3) to aggregate findings on the nature of frames in the media coverage of health risks. This should facilitate future reviews of literature and the formulation of hypotheses, substantiate discussions on the quality of risk reporting, add nuance to what has been a blanket criticism of the media, and help building framing theory by improving its consistency. We found 45 frame-names for just 15 frames, and a tendency to delineate frames for each framing function; some frames were unrelated to the framing functions. The frames that drew most scholarly interest were also the ones employed most often by journalists. Some generalisable statements regarding the use of frames in health-risk reporting can be made, though caution is advised given gaps in the evidence and variations by health risk and/or country of study.

Keywords: health risk; frames; framing theory; health communication

Risk professionals and scholars have long recognised the media as a key player in the social construction of risk (Kitzinger, 1999). When journalists cover risks, they employ frames to demarcate the issue at hand by discerning between perspectives that are worthy of attention and those that are not. In itself, this act of selection is nothing out of the ordinary, as all reporting is necessarily selective. Yet, risk professionals are routinely discontent with what makes the cut, and express concern with regard to the effects risk reporting may have on lay people (see Reed, 2001). Certainly, one may expect *some* media effects given that people lack direct experience with the risks in the headlines, turning news into the main source of information (see Altheide, 2002). Among them are effects on the selection of specific risks people grapple with (setting the agenda), the ways in which they do so (framing the risk), and the steps they take in dealing with those risks (McCarthy, Brennan, Boera, & Ritson, 2008; Olowokure et al., 2012; Rowe, 2000). Risk reporting can also yield societal effects and have policy implications (see Beck,

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2007; Leiss, 2001). As such, collective sense-making and collective trust can be affected, and policy-makers may be forced to respond to some risks over others.

This large potential for media effects has fuelled research into risk reporting, the frames within this reporting, and their respective effects. This study focuses on a specific portion of this body of literature, namely on content analyses guided by framing theory. Framing theory posits that communication is characterised by the articulation of coherent patterns of meaning resulting out of acts of selection and emphasis. In Entman's words:

> To frame is to select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the item described. (Entman, 1993, p. 52)

Defining problems, identifying their respective causes, proposing solutions to address them – together with assigning responsibility to actors for pursuing them –, and offering a moral evaluation, have become known as the four functions of frames (Entman, 1993). To accomplish these functions, frames draw on prevalent ideas, values, and norms in any given culture. This means that frames are culture-bound (Van Gorp, 2007) and suggests that there should be a limited number of news frames – given that the prevalent ideas, values, and norms in that culture are also limited.

Given the fragmentation that has become so typical of the framing literature, it is currently uncertain whether this is actually the case or not. Whenever scholars set out to review framing literature, say on a specific risk, they are bound to encounter a large number of frames. To illustrate, one systematic review across subdisciplines identified 561 frames in published literature (Matthes, 2009). At first glance, this seems to contradict the key premise of framing theory – that the number of frames in any given culture is limited. Yet extensive reviews of literature suggest that a stable set of frames may exist – at least when scholars limit themselves to a specific domain such as HIV/AIDS (Dan, 2018) or science reporting (Nisbet, 2010). The problem appears to lie elsewhere: While the number of frames is limited, that of frame-names, apparently, is not. Scholars interested in theory building and thus in building effectively on others' work, spoke of a 'frustrating' tendency to introduce new names in each study for frames already described in previous publications (Hertog & McLeod, 2001, p. 152).

Against this background, this paper reports a systematic review of studies on the news framing of health risks. We employ this procedure (1) to determine if some of the frame-names circulating in the literature stand for very similar or even identical constructs (and can thus be condensed); (2) to determine how they relate to the four framing functions and to each other; and (3) to aggregate findings on the nature of frames in the media coverage of health risks (i.e. prevalence of the frames, and variations by health risk and/or country of study). Pursuing these three aims is relevant for those interested in the relationship between health, risk, and society for the following reasons. First, our review can raise awareness for the various names under which the same constructs circulate in the literature. This can facilitate the literature review preceding any empirical study to come by providing a more complete list of search terms and, thereupon, allow for the formulation of more plausible research hypotheses. Such a thorough review of the literature can substantiate discussions on the quality of risk reporting by revealing the extent to which research findings are generalizable and pundits' discontent with risk reporting justified. This can add nuance to what has been a blanket criticism of the media. Second, our review can help in

the development of understandings of framing, a theory of great potential that risks becoming 'a victim of its own success' (Entman, Matthes, & Pellicano, 2008, p. 175) – precisely for the lack of consistency in the way it is employed. The consistency that can be achieved through systematic reviews should enable researchers to build on each other's work more efficiently.

Framing theory

News, including news about health risks, is often presented in a predictable fashion. This led Karpf (1988) to argue that news items are not new and different, but rather 'news' are 'olds' (p. 28). Frames can be understood as 'organizing principles that are socially shared and persistent over time, that work symbolically to meaningfully structure the social world' (Reese, 2001, p. 11). They are schemes of interpretation that guide people – journalists and audiences alike – in making sense of their experiences by categorising, organising, and interpreting incoming information. This incoming information is evaluated on how it fits into one's pre-existing frames; then, it is assembled and processed accordingly. As such, frames expedite news writing by journalists and news processing by audiences (see, e.g. Schudson, 2003).

Ever since the introduction of framing theory, scholars agreed that 'all frames are not created equal' (Levin, Schneider, & Gaeth, 1998, p. 149). Nonetheless, there is considerable disagreement over which kind of constructs should be classified as frames and prioritised in research (Entman et al., 2008; Semetko & Valkenburg, 2000): generic vs. issue-specific and procedural vs. substantive.

The evaluation of generic frames and their counterparts, issue-specific frames, is perhaps the most contentious point. Generic frames – such as conflict, horserace, or human interest – serve as scripts and provide the 'skeleton' on which 'the flesh of the news story' is hanged (Bird & Dardenne, 1988, p. 73). Accordingly, they can be applied to all sorts of topics, from politics to sports. Being so wide in scope, generic frames are sometimes denied frame status (Entman et al., 2008).

By contrast, issue-specific frames are only applicable to one or a few topics – this is, for instance, the case with the 'pro-life' frame in the abortion debate. Often times, issue-specific frames are broken down into elements delineated based on Entman's four framing functions: problem definition, causal interpretation, treatment recommendation, and moral evaluation (David, Atun, Fille, & Monterola, 2011; Matthes & Kohring, 2008). Some scholars question whether it is justified to think of issue-specific frames as *recurring* patterns in the media coverage: They might be too narrow or too precise for this description to be accurate (Van Gorp, 2007).

It is worth noting that different authors use different terms for these two categories, including 'macro frames' or 'cultural narratives' instead of 'generic frames,' and 'micro frames' instead of 'issue-specific' frames (see, for example Coleman & Wu, 2015, p. 85). For consistency purposes, we use the terms 'generic' and 'issue-specific' throughout this paper.

Substantive frames are those that relate to the four functions, whereas procedural frames lie outside of these functions (Entman, 2004, pp. 5–6). Procedural frames are described as more narrow in focus and function, and considered unable to stimulate the public to take part in public deliberation (Entman, 2004, pp. 5–6). Even though Entman has not addressed this explicitly, there appears to be some overlap between the generic/procedural and the issue-specific/substantive categories, respectively. What is known as a conflict frame for instance – actors involved in the issue at hand are pitted against each other – clearly lies outside the

framing functions and is thus procedural; it is also generic, because it can be expected to be employed in all kind of specialised reporting. By contrast, the health severity frame – which presents the impact of a health risk on human life – defines the boundaries of the problem and is thus substantive (albeit just one of the four framing functions); it is also issue-specific, as it can only be employed in news reports about health. Up until this point, the categories generic/procedural and issue-specific/substantive, respectively, seem redundant. But this is not always the case, as exemplified by the reassurance frame – the reporting where audiences are told not to worry. This kind of interpretation is not linked to any issue in particular, which makes it generic; on the other hand, it provides a moral judgement of the developments reported and can thus be categorised as substantial.

In this study, we take a pragmatic approach in dealing with this difference of opinion regarding the evaluation of these four types of constructs. As all four categories continue to be the focus of a considerable number of studies, regardless of the criticism of this inconsistency, we include all of them in our systematic review. Each frame shall be classified as either issue-specific or generic, and as either substantive or procedural, respectively. In this way, our results should be informative for scholars regardless of their views on framing.

Methodology

This study uses a systematic review to address the research aims formulated in the introduction. In simple terms, systematic reviews are those that attempt to address a clear purpose or question by using published studies as the research material (Jesson, Matheson, & Lacey, 2011). Systematic reviews – on account of their identification, evaluation, and synthesis of current knowledge – are crucial to the evidence-based movement and instrumental in revealing areas on which scientific consensus was reached and those in which consensus is still lacking (Jesson et al., 2011). As such, they can help achieve consistency in a specific body of research by highlighting similarities and differences in conceptual work and methodology, which may be responsible for an apparent lack of consistency in previous studies (Jesson et al., 2013). By revealing such differences, systematic reviews can help reconcile seemingly contradictory evidence, and enable researchers to build on each other's work more efficiently. Published research was chosen over alternative sources of data – e.g., interviewing risk scholars – because it seemed like a more objective way to uncover potential inconsistencies in research than individual accounts.

A systematic review was preferred to a narrative one on account of the benefits of the former. The main distinctive feature of systematic reviews is the use of 'a detailed and comprehensive plan and search strategy derived a priori' to select the studies to be reviewed (Uman, 2011, p. 57). These procedures increase the chances that the review is an accurate representation of the state of research and decrease selection bias. The potential for bias is further reduced by using the same framework to extract the information of interest from each study (Petticrew & Roberts, 2005; Pope, Mays, & Popay, 2007).

Furthermore, we used a systematic review instead of a content analysis of studies as the former seemed more appropriate given our aim to clarify concepts rather than aggregate evidence say on a specific effect of the media coverage. Nonetheless, we acknowledge that systematic reviews do resemble inductive approaches to content analysis – known mostly from qualitative studies – in that a codebook is not developed a priori based on previous studies (deductively) (Krippendorff, 2018; Mayring, 2002).

Rather, categories are developed based on the material to be analysed itself and the conceptual work at play differs from coding as known from content analyses (Jesson et al., 2011; Petticrew & Roberts, 2005; Pope et al., 2007; Uman, 2011). As such, while decisions must be well documented and reproducible, it is not common to employ coders or report intercoder reliability.

Study selection

To identify the corpus of studies to include in our review, we searched the *Communication & Mass Media Complete* database on EBSCO*host* for articles containing the terms 'risk;' 'health;' and 'frames' or 'framing;' and 'news;' 'media;' or 'journalism' in their abstracts. This search strategy yielded 71 journal articles and conference papers. To include interdisciplinary risk research in our review, we also entered our search phrase on the websites of *Health, Risk & Society*, and *Journal of Risk Research*. This resulted in an additional 14 hits.

Upon reading the abstracts of all 85 studies, we deemed 50 of them not relevant, because they were either book reviews or media effects studies, or because they did not report any empirical data analysis. In other words, the selected articles ($k = 37$) met both of the following criteria: (1) the media coverage of at least one health risk was empirically analysed and (2) news frames were identified. Each of these studies was scrutinised in depth using the guidelines of Petticrew and Roberts (2005) and Pope et al. (2007). The analysed studies are marked with an asterisk in the literature list.

Procedure for the analysis of the studies

On account of the complex conceptual work required for addressing the research aims pursued here, the authors decided against delegating the analysis to research assistants and conducted the analysis themselves. The analysis involved several steps. We started by reading each study in the sample in full and collecting in a spreadsheet identifying information (author, year, title, journal) and information about risk reporting (the health risk at hand; the country of study; the names scholars used for the constructs they operationalised – i.e. the frame-names; the way the constructs were operationalised; and empirical results on the prevalence of each frame).

Then, we addressed the first aim we pursue here, namely to determine if the frame-names circulating in the literature stand for very similar or identical constructs, and can thus be condensed. We used a skimmed version of the initial spreadsheet containing just the frame-names, definitions, and operationalisations, next to an ID. First, we sorted the table alphabetically by frame-names. This immediately revealed constructs with identical or similar names that have been identified in several studies in the sample (e.g. 'episodic frame'). We checked their conceptualisation and operationalisation, and – provided the frame-name had been used consistently in all studies – we noted an abbreviated definition and listed the respective studies in brackets. Next, we used this abbreviated definition to identify constructs that were very similar or identical, but were named differently. For instance, the abbreviated definition of the episodic frame read, 'health conditions need individual solutions, because individual lifestyles caused them.' Thus, the terms 'individual,' 'lifestyle,' and 'behaviour' guided us in identifying constructs that may be similar in meaning, but were named differently in other studies. We searched the spreadsheet for these

terms and synonyms, and read the respective definitions. When the definitions were very similar to those of the initial frame-name, we listed these additional studies behind the ones we had already collected based on the frame-name identified through alphabetical sorting (here, 'episodic frame') and noted the alternative names used in these other studies. In our example, the alternative frame-names identified through these means were 'behavioural,' 'individualizing,' 'individual prevention,' and 'lifestyle.' We proceeded like this with every recurring frame-name in our sample.

Thereupon, the table contained some frame-names that could not be linked to any other constructs in the previous steps. We read their respective definitions and compared them with those of the constructs compiled thus far. When this comparison suggested that the constructs were very similar or even identical, we added the respective study and the alternative name to the existing list. For instance, for the episodic frame, this analytical step revealed that the frame-names 'moral' and 'fattest nation' stood for the same construct as the episodic frame and the various alternative names already identified in the previous step. In naming the frames, we settled for the frame-name that was used most consistently in the studies identifying the respective construct; in our example, this was 'episodic frame.' This iterative process of identifying and merging very similar constructs was a sensitive one, as we had to prevent carrying this attempt at condensation to excess. Instead, we wanted to leave room for the possibility that some constructs may be unique. Hence, frame-names that appeared just once and could not be merged with others in a meaningful way were put in a separate list.

We then moved to collecting data for dealing with the second aim of our study. To determine how the frames identified in previous literature relate to each other, we closely examined the definitions of each of the 15 frames. This revealed that some were broader than others while still similar in content. For example, the frames health severity, human interest, and economic consequences deal with specific aspects of the impact of the health risk: overall impact on human life, impact on specific individuals, and impact on finances. The consequences frame also addresses the impact of the health risk, but does so in a more broad way, as all kind of impacts are subsumed here. So, there is a similarity between the four frames in terms of content, but one is more expansive than the rest.

To determine how each of the frames relates to Entman's four framing functions, we consulted the definitions of the frames and those of the framing functions as articulated by Entman (1993; 2004). We examined if all/several functions were covered by each frame, or if it was just one function. For instance, the medical frame, which identifies biomedical factors as cause for health problems (function 'causal interpretation'), and promotes a scientific solution to this problem (function 'treatment recommendation'), touches upon two functions. By contrast, the health severity frame addresses just one function, namely 'problem definition.' Frames like these ones were categorised as substantial; remaining ones were deemed procedural. Furthermore, frames applicable exclusively to health risks were categorised further as issue-specific (e.g., health severity frame), whereas broader ones were classified as generic (e.g., thematic frame).

Finally, to address the third aim of our study – the prevalence of frames, and potential variations by the health risk and the country of study – we complied this data, which we had collected from each study, by frame.

Findings

Descriptives

Of the 37 studies included in this systematic review, a wide majority investigated health-risk reporting in North America ($n = 15$); studies on Asian reporting were the second largest group ($n = 8$). There were four studies on risk reporting in European countries, one on Australia, and one on sub-Saharan Africa. Seven studies compared risk reporting in two countries (two each on: Canada and the USA, the UK and the USA, and China and the USA; one on South Korea and the USA). By country, the USA has been the focus of most studies in our sample, followed by Canada, the UK, and China. There were two studies each on the Netherlands, Singapore, and South Korea; and one study each for Australia, Germany, India, Ireland, and Taiwan. The studies were published between 2002 and 2015, most of them in 2012 ($n = 9$), 2014 ($n = 4$), and 2006 ($n = 4$). Most appeared in *Health, Risk & Society* ($n = 7$) and *Health Communication* ($n = 6$). Three each were published in *Journal of Health Communication* and *Science Communication*; three were conference papers from annual meetings of the *International Communication Association*; two stemmed from the *Journal of Risk Research*. The remaining 15 articles were published in journals appearing just once in this sample. The most studied health risks were influenza ($n = 8$) and severe acute respiratory syndrome (SARS) ($n = 6$). Escherichia coli, nanotechnology, and obesity were the focus of three studies each; two studies each analysed reporting about bovine spongiform encephalopathy (BSE), cancer, and HIV/AIDS, respectively. Two studies examined the media coverage of all health risks during a specific period of time in a certain context. The remaining twelve studies focused on other risks, such as genetically modified organisms (GMOs), the West Nile virus (WNV), and heart disease.

Aim 1: A clarification of frames and a documentation of (in)consistent names

Taken together, the studies reviewed here reported 45 frame-names, i.e. they identified in total 45 constructs in their respective samples of the media coverage of health risks. By virtue of their names, most of these constructs appeared to be unique. Yet, our analysis of the conceptual and operational definitions scholars provided for each of these constructs revealed that many of them were very similar to each other or even identical: We were dealing with 45 different *names* for just 15 *frames* (the procedure involved multiple steps and was described in detail in the 'Methodology' section). Table 1 contains an overview of these 15 frames, a brief definition, and the various names under which they circulate in the literature.

Deciding on a name was straightforward for those constructs for which we encountered no alternative names (i.e. 'human-interest,' 'gain,' 'loss,' and 'uncertainty'). As mentioned in the Methodology, our general approach was to use the frame-name that was used most consistently in the studies identifying the respective construct. The process was somewhat more complex for three remaining constructs where there was no clear favourite in academic vocabulary. In these cases, we chose those names that appeared most suitable. The name 'attribution of responsibility' was chosen as it seemed able to strike a balance between 'responsibility' and 'blame,' as these alternatives appeared, respectively, too unspecific or too narrow. 'Health severity' was chosen despite it being less common than 'health' for two reasons. First, 'health' is a descriptor that is too featureless for use in studies investigating health reporting; each frame is somehow related to health. Second, all other alternative names evolved around notions of severity and magnitude. The combination of these two notions (health and severity) produced a

Table 1.   Frames overview.

Frames	Definition	Studies using this terminology	Alternative names
Consequence	The consequences of the health risk.	Shih et al. (2008); Hove et al. (2015)	Social indications and risks (Allan, Anderson, & Petersen, 2010)
Health severity	The impact of a health risk on human life as a whole.	Hong (2007)	Health (Driedger et al., 2009; Haigh, 2012; Mistry & Driedger, 2012), severity (Beaudoin, 2007), risk (D. C. Oh & Zhou, 2012), avian pandemic (Siu, 2008), the 1918, 1957, and 1968 flu pandemics (Siu, 2008); risk magnitude (Hove et al., 2015)
Human interest	The impact on the lives of those affected.	Hove et al. (2015); Beaudoin (2007); Hong (2007); Krishnatray and Gadekar (2014); Kuttschreuter et al. (2011); Luther and Xiang (2005); D. C. Oh and Zhou (2012)	–
Economic consequences	The economic impact of the health risk on a country, region, institution, group, or individual.	Beaudoin (2007); Driedger et al. (2009); Hong (2007); Kuttschreuter et al. (2011); Luther and Xiang (2005); D. C. Oh and Zhou (2012)	Funding (Allan et al., 2010)
Attribution of responsibility	Health problems and risks as the result of somebody's actions; certain actors as responsible with finding a solution.	Beaudoin (2007); Hong (2007); Hove et al. (2015); Krishnatray and Gadekar (2014)	Responsibility (Buus & Olsson, 2006; Hove et al., 2015; Kuttschreuter et al., 2011; Luther & Xiang, 2005; J. H. Oh et al., 2012), blame (Driedger et al., 2009; Holton, Weberling, Clarke, & Smith, 2012; Mistry & Driedger, 2012); inquiry/testimony (Mistry & Driedger, 2012)
Action	Measures that regular people and those in charge (can) take to contain a health risk and prevent contagion.	Krishnatray and Gadekar (2014); J. H. Oh et al. (2012); Shih et al. (2008)	Political strategies (Haigh, 2012), leadership (Luther & Xiang, 2005), public health and consumer safety (Raupp, 2014), surveillance (Siu, 2008), combating the disease (Siu, 2008), description and control actions (Driedger et al., 2009; Mistry & Driedger, 2012), government responses (Driedger et al., 2009), inquiry (Driedger et al., 2009)

(continued)

Table 1. (*Continued*).

Frames	Definition	Studies using this terminology	Alternative names
Thematic	Health conditions need social and political solutions, because larger forces and issues caused them.	Buus and Olsson (2006); Dudo, Michael, and Dominique (2007); Higgins et al. (2006); Lee and Basnyat (2012); Strekalova (2015)	Systemic (Lawrence, 2004), societal (Stefanik-Sidener, 2013), social-structural (Clarke & Binns, 2006), political or health (Pickle et al., 2002), political economy (Clarke & Everest, 2006), blame/outrage (Claassen et al., 2012), environmental (De Brún, McKenzie, McCarthy, & McGloin, 2012)
Episodic	Health conditions need individual solutions, because individual lifestyles caused them.	Buus and Olsson (2006); Dudo et al. (2007); Higgins et al. (2006); Lee and Basnyat (2012); Strekalova (2015)	Behavioural (De Brún et al., 2012; Stefanik-Sidener, 2013), individualising (Lawrence, 2004), individual prevention (Wang, Smith, & Worawongs, 2010), lifestyle (Clarke & Binns, 2006; Clarke & Everest, 2006), moral (Pickle et al., 2002), fattest nation (Holland et al., 2011)
Medical	Health conditions need scientific solutions, because biomedical problems caused them.	Clarke and Binns (2006); Clarke and Everest (2006); Hurley, Sangalang, and Muddimann (2009); Stefanik-Sidener (2013)	Factual information (Pratt et al., 2002), scientific-technical (Claassen et al., 2012), medical-scientific progress (Raupp, 2014), vaccine (Siu, 2008), scientific discovery (Allan et al., 2010), medical discovery (Allan et al., 2010); risk (D. C. Oh & Zhou, 2012)
Uncertainty	Nothing is known for sure about the health risk.	Hove et al. (2015); J. H. Oh et al. (2012); Shih et al. (2008)	–
Alarmist	Unsubstantiated claims blow the risk out of proportions.	–	Fear-panic (Krishnatray & Gadekar, 2014), alarm (Chang, 2012), fear (Siu, 2008), sensationalism (Hove et al., 2015)
Reassurance	The health risk is not that serious and/or those in charge are able and successful in dealing with it; no need to worry.	Hove et al. (2015); J. H. Oh et al. (2012); Shih et al. (2008)	Coping (Chang, 2012); trust (Mistry & Driedger, 2012)
Gain	The benefits of adopting certain behaviour are highlighted.	(Lee, 2014; Lee & Basnyat, 2012; Peng & Tang, 2010)	–

(*continued*)

Table 1.   (*Continued*).

Frames	Definition	Studies using this terminology	Alternative names
Loss	The costs of not adopting certain behaviour are emphasised.	*See above*	–
Conflict	Antagonistic terms; parties pitted against each other.	Hove et al. (2015); Kuttschreuter et al. (2011); Luther and Xiang (2005); D. C. Oh and Zhou (2012); Weaver et al. (2009)	Conflicting interests (Claassen et al., 2012); fresh figures (Holland et al., 2011)

suitable descriptor for this construct. Finally, we settled on the term 'alarmist' as it seemed the best antonym to its counterpart, 'reassurance,' and because all terms evoked notions of sensationalism, fear, and panic – 'alarmist' is arguably a good umbrella term for all of them. For the remainder of this paper, we refer to the 15 frames identified in the studies in our sample using these names – as given in the first column of Table 1.

We now move to give description of each of the 15 frames; brief definitions are offered in the second column of Table 1.

News through the *consequence* frame essentially announces what had happened, i.e. what the problem is. It presents the impact of the health risk, be it on human life (a specific individual or overall assessments), on society as a whole, or on more specific aspects of (public) life like economy.

The *health severity* frame presents the health risk from the perspective of its impact on human life at large. This mostly involves numerical information in the form of risk magnitude information (*How bad is it?*), risk comparisons (*Is it worse than other known risks?*), incidence/morbidity statistics (*How many people were diagnosed?*), or mortality rates (*How many people died?*). Risk comparisons are particularly important as they present a reference point on which people can anchor their judgements about the present risk (Tversky & Kahneman, 1974). Linking the current risk to something known to be curable is likely to reassure the public, whereas linking it to HIV, for example, is likely to alarm the public (Heffernan, Misturelli, & Thomson, 2011).

News through the *human interest* frame presents the way the health risk has impacted the lives of individuals and small groups who are directly affected. Such reports are typically emotionally engaging and likely to influence the way audiences process the incoming information and make decisions (see Fagerlin, Peters, Schwartz, & Zikmund-Fisher, 2011; Waters, McQueen, & Cameron, 2013).

The *economic consequences* frame presents the health risk from the perspective of its economic impact on a country, region, institution, group, or individual (see Semetko & Valkenburg, 2000). When journalists focus on the financial implications of events, including risks, they 'follow the money' to discover where the story leads.

The *attribution of responsibility* frame presents health problems and risks not as arriving out of the blue but rather as the result of somebody's actions. Certain individuals are then constructed as responsible for finding a solution. This frame was among those reported in Semetko and Valkenburg's (2000) seminal study, and speaks to a core task of journalism – that of identifying wrongdoers and holding them accountable.

Scholars interested in the *action* frame study the prevalence of information about what public officials do to contain the risk and what regular people can do to this end. This type of reporting is thus interested in solutions, and corresponds to what is currently known as 'solutions journalism' (Benesch, 1998, p. 36).

Thematic frames and their counterparts, episodic frames, were both introduced to communication research by Iyengar (1991) based on the attribution theory (Weiner, 1993). *Thematically* framed articles take the form of 'a time-out' or a 'backgrounder report' (Iyengar, 1991). Health conditions in these articles appear to have been caused by larger forces – such as limited access to health services – that require social and political solutions, such as improving infrastructure. News reports with *episodic* frames, on the other hand, are 'hit-and-run stories' (Gronbeck, 1996, p. 32) that deal with 'the 4Ws – who, what, when and where' and are driven by concrete, attention-grabbing events that appear to be isolated (Iyengar, 1991). In health reporting, an episodically framed article presents individuals as creators of their own destinies. Governments are not seen as
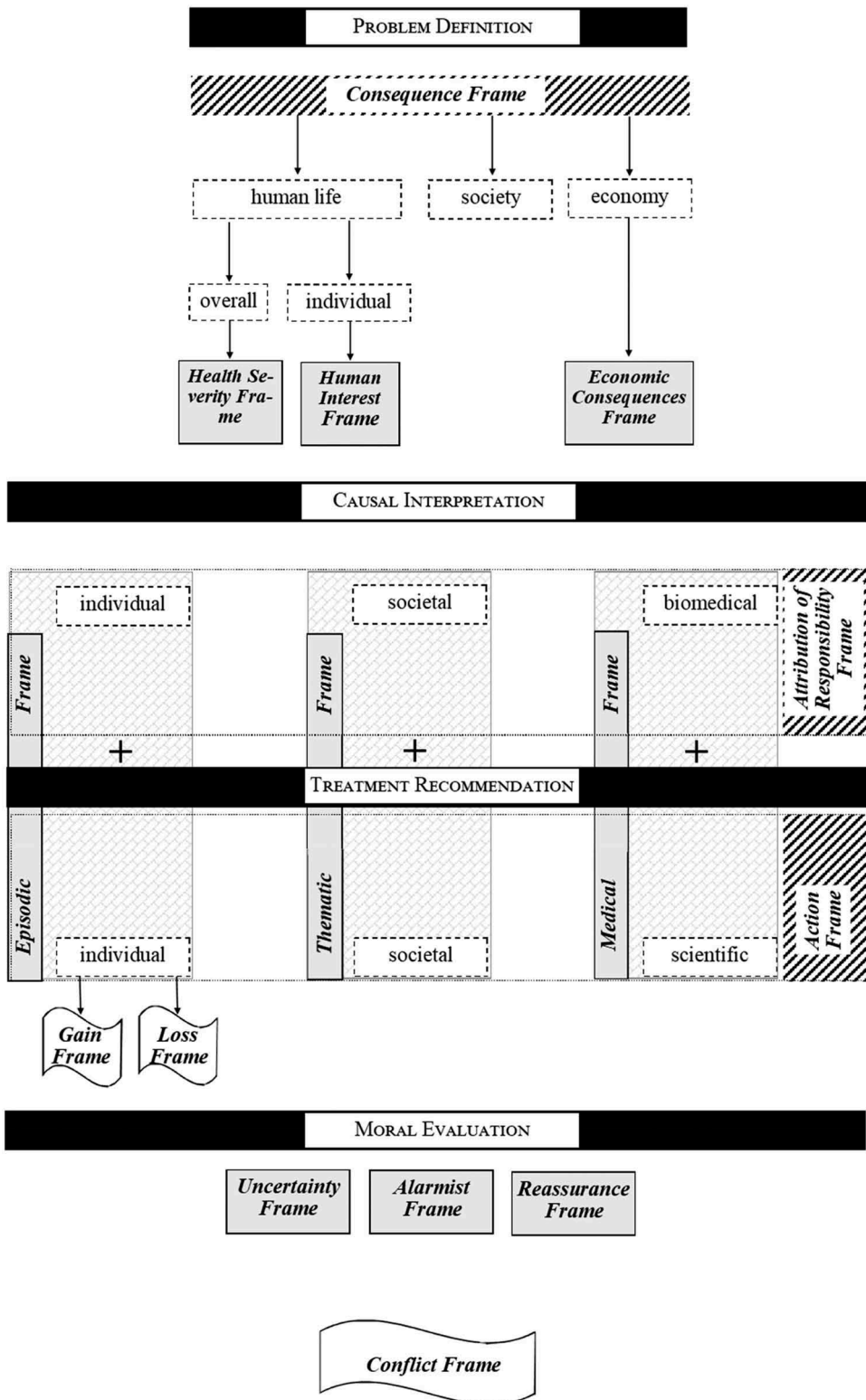
Figure 1.   The relationship among frames in health-risk reporting, and between frames and Entman's framing functions.

primarily responsible for the health of their citizens (Higgins, Naylor, Berry, O'Connor, & McLean, 2006; Lawrence, 2004). When individual lifestyles are presented as the cause of ill health, the recommended solution is often individual behaviour change.

When a *medical* frame is used in media coverage, health conditions seem in need of scientific solutions, because biomedical problems caused them. The individual or societal causes of disease are not of interest, nor are attributions of responsibility. Rather, causes and solutions for diseases are seen in the biology of the human body (e.g., cells, genes, or organs). The body or a body part is malfunctioning; medicine appears able to fix the body or to replace body parts (see Karpf, 1988).

Where too little is known about a health risk (Turner, Skubisz, & Rimal, 2011) then the *uncertainty* frame is often resorted to in reporting. In such cases, the story presents the health risk as volatile: Most aspects related to it are presented as not fully understood or doubt is cast on what is presented as known. News articles may contain multiple hypothetical scenarios, together with an emphasis on the uncertainty connected to the chance that any of them will actually occur. Even though uncertainty is an inherent feature of risk, journalists are not drawn to this type of reporting (Kitzinger & Reilly, 1997; Nelkin, 1995) and may be inclined to turn 'a scientist's "may be" into a confident "is"' (Schünemann, 2013, p. 141).

Studies set out to identify the prevalence of the dichotomist *alarmist* and *reassurance* frames reflect long-standing academic interest in the extent to which the media play up or play down health risks (see Kasperson, Kasperson, Pidgeon, & Slovic, 2003). Health risks covered through *alarmist* frames are characterised by unsubstantiated claims, exaggerating the risk, and potentially amplifying public perceptions of risk. By contrast, when journalists employ *reassurance* frames, the risk is presented as less serious than other known risks and/or those in charge appear capable and successful in dealing with it. The implication is that audiences can rest assured.

In the face of a health risk, some news reports address the benefits of adopting certain behaviour, such as applying sunscreen, or the harm for not doing so (Levin et al., 1998). These differences in the valence ascribed to the same choice mean that the same information may be cast in a positive (*gain* frame), or negative light (*loss* frame). These frames were introduced by Kahneman and Tversky (1979) in the context of prospect theory.

The *conflict* frame presents any aspect pertaining to health risks in antagonistic terms by pitting actors and their views against each other. This type of reporting can be considered the result of journalists' implementation of negativity as a criterion for selecting events for coverage (see Graber, 1989). Journalists reporting about risks have a strong tendency towards this type of reporting (Kitzinger & Reilly, 1997).

Aim 2: The relationship among frames, and between frames and Entman's framing functions

In this section, we explain how the 15 frames relate to each other and how each of them relates to Entman's four framing functions. We propose that the frames reported in the studies included in our sample can be grouped in categories based on (1) the framing function/s they perform, if any; (2) the number of framing functions they carry out; and (3) their degree of informational specificity. A visualisation of this categorisation is shown in Figure 1. To assist the reader, the figure also includes brief information on the content of the frames; this is given in the white text boxes with dashed borders.

First, frames can be grouped by their focus on defining problems, identifying causes, proposing treatments, and/or advancing a moral evaluation in connection to the health risk at hand. Alternatively, they can lie outside the scope of these functions. In Figure 1, the framing functions are depicted in black boxes; the corresponding frames are given below each of them in light-grey or diagonal stripes. The frames that are not immediately related to any of the framing functions are given in the white curved shapes.

As shown in Figure 1, the frames *consequence, health severity, human interest*, and *economic consequences* define the problem at hand, i.e. the health risk, by addressing what happened and to what effect. The *attribution of responsibility* frame is the only one focused exclusively on causal interpretation, just like the *action* frame is the only one devoted exclusively to treatment recommendation. The *episodic, thematic*, and *medical* frames focus both on what had caused the risk, and on what should be done to contain it by whom. Finally, the *uncertainty, alarmist*, and *reassurance* frames provide a moral evaluation of the risk, in that they offer cues as to whether the public should be alarmed, reassured, or keep track of future developments in light of uncertainty. On account of their performance of at least one framing function, these frames can be categorised as substantive.

By contrast, the remaining three frames are procedural; they are depicted in white curved shapes in Figure 1. *Gain* and *loss* frames are valence-oriented. As such, their purpose is not to articulate the one or the other framing function, but rather to cast information pertaining to one – treatment recommendation – in either a positive or a negative light. Finally, the *conflict* frame is concerned with reporting about some actors being at odds with others. This type of reporting is seldom about the matters on which actors argue about, but rather about the existence of dissent.

Second, and feeding off of the first classification criterion, frames can be grouped by size based on the number of framing functions they perform. Most frames identified in the studies analysed here addressed just one framing function – as depicted in light-grey in Figure 1. Three frames – namely *episodic, thematic*, and *medical* – touched upon two framing functions, namely causal interpretation and treatment recommendation. This is illustrated in Figure 1 with the help of plus signs between individual causes and individual solutions (*episodic* frame), between societal causes and societal solutions (*thematic* frame), and between biomedical causes and scientific solutions (*medical* frame).

Third, by their degree of informational specificity, frames can focus on just one category of aspects related to the health risk, or on several. In Figure 1, this is illustrated by the difference in patterns and colours chosen for each frame. Frames given in boxes with diagonal stripes – namely *consequence, attribution of responsibility*, and *action* – have a low informational specificity. This means that scholars collapse all sorts of consequences, causes, and solutions into each of these frames. This includes but is not limited to those consequences (on human life at the individual or the aggregate level, and on the economy), causes (individual, societal, biomedical), and solutions (individual, societal, scientific) that are the focus of frames of *human interest, health severity, economic consequences, episodic, thematic*, and *medical*. These latter frames score high on informational specificity.

Aim 3: Frame prevalence and variations by country of study and health risk

This section begins with an overall assessment of the prevalence of each frame – in the order they are listed in Figure 1. Hereby, we distinguish between a frame's standing among academics (i.e. scholarly interest) and its occurrence in the respective samples of news analysed in each study (i.e. journalistic use). Whenever research findings seem inconsistent – i.e. some studies find a frame to be dominant, others negligible – we search for explanations in terms of the country of study and/or in the nature of the health risk at hand.

More than a third of the studies in our sample set out to investigate at least one of the frames pertaining to the first framing function – 'problem definition.' As just three studies aimed to identify the *consequence* frame, there was a clear scholarly preference for the three frames scoring high on informational specificity – *health severity, human interest*, and *economic consequences* – which were investigated in seven to eight studies each (see details in Table 1). Most of the studies in the second group only accounted for one of these three frames; four studies investigated both the *human interest* and the *economic consequences* frames (Beaudoin, 2007; Hong, 2007; Kuttschreuter, Gutteling, & de Hond, 2011; Luther & Xiang, 2005); one included the frames *health severity* and *economic consequences* in the analysis (Driedgeret al., 2009); only two studies analysed all three frames (Hong, 2007; D. C. Oh & Zhou, 2012). Finally, one study recorded both two of the frames scoring high on informational specificity – *human interest* and *health severity* – and the *consequence* frame (Hove, Paek, Yun, & Jwa, 2015).

Most studies in the sample found three of the four 'problem definition' frames to be dominant in their respective samples of health-risk news; findings on the frame *economic consequences* were mixed. Despite this tendency, some variations by health risk and/or country of study could be observed. First, the *consequence* frame was more common in the US news about avian flu and WNV, respectively, than in reports about BSE (Shih, Wijaya, & Brossard, 2008). Second, Hove and colleagues' (2015) research on South Korean news about cancer-causing substances was the only one suggesting that neither the *health severity* nor the *human interest* frame were paramount to risk reporting. Third, the *human interest* frame was less likely in Chinese-language news published in Canada and China about SARS, than in English-language news in Canada and the USA, respectively (Beaudoin, 2007; D. C. Oh & Zhou, 2012). Fourth, most studies interested in the *economic consequences* frame found it to be employed rather seldom (Beaudoin, 2007; Hong, 2007; Luther & Xiang, 2005; D. C. Oh & Zhou, 2012). Interestingly, all of these studies – and none of those that deemed the *economic consequences* frame to be dominant – investigated the media coverage of SARS.

We now move to the frames related to the framing functions 'causal interpretation' and 'treatment recommendation' (see Figure 1). Given the interlocked nature of the framing functions in three of these five frames (*attribution of responsibility, action, thematic, episodic, medical*), we address them together. About one third of the studies in our sample attempted to identify at least one of these frames (see Table 1 for a list). This substantial scholarly interest was generally matched by their use in news reports: All frames but one – the *thematic* frame – played an important role in the media coverage of health risks.

Some important variations were observed for this group of frames. First, three studies found that US journalists used the frames *attribution of responsibility* and *action* more often than their Chinese and South Korean colleagues did, at least in the case of SARS and H1N1 (Beaudoin, 2007; Luther & Xiang, 2005; J. H. Oh et al., 2012). Second, even

though *episodic* frames generally prevailed over *thematic* ones, four studies found the opposite (Higgins et al., 2006; Lee & Basnyat, 2012; Pickle, Quinn, & Brown, 2002; Strekalova, 2015). No clear pattern that would be able to explain this inconsistency emerged – with regard to health risk or country of study. Third, one study took a different approach and conceptualised *thematic* and *episodic* frames as ancillary to others (Buus & Olsson, 2006). In their analysis of reporting on SARS in outlets from the UK and the USA, these authors found that the *attribution of responsibility* frame was mostly *thematic* in nature, whereas the *economic consequences* frame was generally *episodic* (Buus & Olsson, 2006). Fourth, results on the *medical* frame were very consistent; this frame was featured prominently across health risks and countries of study.

By comparison to the others, the three frames referring to the function 'moral evaluation' were neglected in previous content analytical studies: Only three groups of scholars attempted to identify the *uncertainty* frame; slightly more included *alarmist* and/ or *reassurance* frames (see Table 1 for a list of the studies). For the *uncertainty* and the *reassurance* frames, this corresponded with the virtual absence of these frames in the respective news samples analysed. Yet, the *alarmist* frame was generally found to be dominant.

The last group of frames we analysed in terms of (variations in) prevalence was that of procedural frames (presented in white curved shapes in Figure 1). Only three studies analysed the prevalence of *gain* and *loss* frames; seven investigated the *conflict* frame. Research findings with regard to their respective prevalence are mixed. Two of the three studies in our sample analysing *gain* and *loss* frames found them to be rather common (Lee, 2014; Lee & Basnyat, 2012); the third did not (Peng & Tang, 2010). This variation cannot be explained by risk nor country. Also, all three studies found *gain* frames more common than *loss* frames (Lee, 2014; Lee & Basnyat, 2012; Peng & Tang, 2010). Four studies found that the *conflict* frame played a major role in the coverage of health risks (Claassen, Smid, Woudenberg, & Timmermans, 2012; Kuttschreuter et al., 2011; Weaver, Lively, & Bimber, 2009), but three suggested otherwise (Holland et al., 2011; Luther & Xiang, 2005; D. C. Oh & Zhou, 2012). No clear pattern emerged that would be able to explain this variation in the use of the *conflict* frame.

Discussion

We surveyed 37 studies on the media coverage of health risks with three key aims. First, we aimed to review the most prevalent news frames identified in previous literature on the media coverage of health risks. Assuming a large number of frames and some overlap among them, we investigated the possibility that multiple frame-names stood for very similar or even identical frames. A second aim was to reveal how news frames related to each other and to Entman's framing functions. The third aim we pursued here was to assess the prevalence of each frame in health-risk reporting, and to account for the variations observed. We now discuss the findings in relation to each of these aims.

A first finding was that 45 frames occurred in more than one study in our sample. We interpreted their reoccurrence across several studies as an indicator of the relevance of these constructs to the media coverage of health risks. Upon a closer look, we discovered we were not dealing with different frames, but rather with different frame-names. In multiple steps, based on the way scholars defined and operationalised these constructs, we condensed these frame-names to just 15 frames. The large discrepancy between the low number of frames and the high number of frame-names is worth discussing in detail.

Interestingly, most of the frame-names used consistently in these studies were those compiled in Semetko and Valkenburg's (2000) often-cited study. This highlights the need for structuring work in framing scholarship. While we cannot know why scholars proposed new names for existing frames in their studies, we outline two possible explanations.

First, scholars may have considered the existing frame-names unsuitable to describe the constructs they identified. In this case, we would encourage scholars to follow this path sparingly and to address this issue explicitly in their publications in order to help their readers connect each study's results with previous research. However, since none of the studies in our sample contained an explicit discussion of the use of frame-names by comparison to established names, this may not be why so many frame-names circulate in the literature.

A second conceivable explanation is that scholars were unaware of the established frame-names for the frames they identified. This does not necessarily mean that their review of literature was poor. In fact, we appreciate the difficulties involved in reviewing a body of research that seems to be growing exponentially. We also recognise that not all authors of the studies analysed here may consider themselves to be framing scholars. They may instead have used framing in a rather narrow, methodological sense. Nonetheless, we must caution that choosing new frame-names for established frames is a slippery slope: The more scholars choose to do this, the harder future reviews of literature will become, and the larger the number of frames will grow, resulting in the various problems we noted in the Introduction. In this regard, we hope the 15 frames to which we condensed previous studies can help control the number of frames in the literature and assist scholars in their theory-building endeavours and avoiding framing theory becoming 'a victim of its own success' (Entman et al., 2008, p. 175).

With regard to our second aim, the analysis revealed that researchers analysing the media coverage of health risks were most interested in frames pertaining to the framing function 'problem definition.' The next largest group of frames were those devoted to the 'causal interpretation.' Researchers also showed some interest in frames focused on 'treatment recommendations,' but barely any interest in 'moral evaluation' frames. Procedural frames were rather uncommon in the sample of studies analysed.

These foci in scholarly interest were generally matched by journalistic preferences of frames. The clear preference for 'problem definition' frames makes sense when considering that problem definition virtually predetermines the rest of the frame (Entman, 1993).

Yet, scholars' and journalists' prioritisation of frames surrounding causes rather than treatments seems problematic (see Benesch, 1998; Entman, 1993). It surely makes a difference which impact of a health risk is highlighted in the media, because consequences yielding a great amount of media coverage are more likely to be addressed politically than those generally ignored; see Yanovitzky (2002) for media's influence on policy. Yet, in the absence of reporting on the respective solutions to problems, this type of reporting may be unable to increase people's self-efficacy and/or motivate them to take part in public life, for example by suggesting support (or opposition) to public policy. In addition, given the relative disregard of 'treatment recommendation' frames in previous studies, we might still lack a thorough understanding of the nature and prevalence of these frames in the media coverage of health risks.

The relative disregard of 'moral evaluation' frames is quite surprising, especially given the interest in the extent to which news serve to alarm or reassure the public. We

would encourage scholars to include these frames in the analysis and to include all of them – not just alarmist *or* reassurance frames, but rather both alarmist *and* reassurance frames. However, it is possible that a moral evaluation of the health risk at hand is implicitly included in some of the other frames (for example the moral evaluation advanced by episodic frames is the denunciation of the individual).

The low number of studies acknowledging procedural frames is quite surprising. *Gain* and *loss* frames in particular have been the focus of a wide array of experimental work. Research into the effects of these frames has been very informative, but experiments may lose some of their relevance where there is a lack of knowledge about these frames' occurrence in mass communication. Future studies into the framing of health risks could help redress the balance by assessing journalists' use of some of the constructs that have been neglected thus far. From the perspective of framing theory, future studies might want to address the framing status of the constructs identified. Indeed, given the tendency to delineate frames out of single framing functions, scholars may otherwise be reproached for diluting the frame concept by overusing it in the context of regular content analyses. Scholars using constructs low on informational specificity, such as 'consequence' or 'action,' may be particularly vulnerable to this criticism. Moving forward, it may be useful to focus on constructs performing several framing functions.

As a side note, before framing's surge in popularity, research on some of the 15 frames had been conducted under different headwords, such as efficacy information or the social amplification of risk framework. In fact, even though such concepts and frameworks still guide a very fruitful line of research, some scholars choose to replace them with framing theory. Scholars new to framing but familiar with health communication and risk research may wonder about the rationale for doing so. The studies analysed here did not provide an explanation. To us, substituting established concepts and frameworks with framing theory seems justifiable only when framing can explain the phenomenon under investigation in a way that other concepts and frameworks cannot. Future studies taking this path should address this issue.

Our third research aim was to assess each frame's prevalence in the media coverage and explain potential variations. Generally speaking, comparative studies analysing the media coverage of several health risks and/or in several countries, and studies that included most of the frames in the typology, were the most informative. This is because research findings are bound to be relative and these studies provided a basis of comparison in themselves. We hope to see more comparative approaches in future research.

Our analysis suggested that some frames may be used more frequently in certain cultural contexts than others. Specifically, the frames *attribution of responsibility, economic consequences, human interest*, and *action* were often, though not always, reported less frequently in news directed at (ethnically) Chinese and South Korean audiences than in news targeting North American audiences. Indeed, this is not surprising, as framing theory conceptualises the use of frames as culture-bound. However, in the absence of a larger number of comparative studies, we must caution against drawing over-simplistic conclusions about 'Western' vs. 'Eastern' health-risk reporting. This may be premature, especially when considering some differences in the nature of the health risks investigated in these studies (Driedger et al., 2009; Pratt, Ha, & Pratt, 2002; Shih et al., 2008). One of the South Korean studies analysed cancer-causing substances, a rather abstract health risk; differences to Western news may have been less clear had the authors focused on cancer itself (Hove et al., 2015). Also, the variations in the use of the

human interest frame in China and the US may not be due to the country of study, as to the operationalisation of this construct. In the Chinese study (Luther & Xiang, 2005), this frame also included stories about medical personnel fighting heroically against SARS. By contrast, the others appeared to focus exclusively on patients and their next of kin. There appeared to be no notable difference in the use of the frames *consequence* and *uncertainty* between Western and Eastern journalists (Hove et al., 2015; J. H. Oh et al., 2012; Shih et al., 2008).

The study we have reported above has important limitations. First, the sole focus of our study was on news frames in the media coverage of health risks. This is just a first step towards reducing the ever-growing number of frames/frame-names and thus towards building framing theory in our subdiscipline. Indeed, similar structuring work is needed in related fields of study, and we hope that more systematic reviews of literature will follow. Related to this, another limitation is that we reviewed only 37 studies. This number arose out of our sole focus on the media coverage of health risks; content analyses on the topic were far less than we had anticipated, and far less than experiments. While this number is rather low, it is not surprising, given that Matthes' (2009) review of framing studies across subdisciplines included 131 studies in total. Focusing on one subdiscipline will necessarily yield a lower number of studies. As we wanted to contribute to health communication scholarship, this drawback was accepted. Future systematic reviews could collect their samples of studies from health-related databases like *pubmed* in addition to the database used in our study.

Even though we reviewed every study we could track, we cannot be sure we accounted for all frames in analyses of health-risk reporting. Nonetheless, we are confident that our overview takes into account all major constructs. We do acknowledge that our study may have yielded different results had we included book chapters, monographs, and studies published in languages other than English. We thus caution the reader that our results may not be reflective of the entire body of academic research on news framing of health risks. Finally, we identified studies by using the word 'risk,' but not its synonyms such as hazard, crisis, threat or danger. While it seems unlikely to us a study on a health risk would not use the word 'risk' even once in the paper, future systematic reviews should include these synonyms in their search phrases.

Conclusion

Our major finding was that scholarly results seem quite consistent in terms of which frames matter, and how prevalent they are in the media coverage. Yet, our review suggests that scholars often use different frame-names for the same frames. We have argued that a more consistent use of terminology will support empirical and theoretical developments in the field. We hope the 15 frames that emerged out of our analysis can help in this regard.

Our findings suggest that some generalisable statements regarding health-risk reporting and the prevalence of frames can be made, albeit caution is advised due to a limited number of studies and variations by health risk and/or country of study. Still, there appears to be a relative lack of *thematic* and *uncertainty* frames, and an overrepresentation of *alarmist* frames. As this has been part of the most vehement criticism of journalism, our findings do not seem to provide support for those arguing that journalists produce sensible coverage of health risks. However, it is important to acknowledge that there are consistent gaps in the evidence.

Scholars, meanwhile, are not always immune to prejudice. For instance, scholars wanting to identify the prevalence of the *alarmist* frame in the news – and deciding against including its counterpart, the *reassurance* frame, in the analysis – may produce one-sided results, which may be alarmist in themselves. To address such gaps in the evidence, we hope to see more studies that include as many of the frames in our typology as possible. This matter seems especially relevant to dichotomist frames. When health communication scholars cooperate in this way towards the goal of building framing theory, they contribute to communication research in general, and moreover to the effective analysis of media coverage of health risks, not just to health communication scholarship.

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Declaration of interest

The authors declare no conflict of interest.

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References

*Allan, S., Anderson, A., & Petersen, A. (2010). Framing risk: nanotechnologies in the news. *Journal of Risk Research*, *13*(1), 29–44. doi:10.1080/13669870903135847

Altheide, D. L. (2002). *Creating Fear: News and the Construction of Crises*. New York: de Gruyter.

*Beaudoin, C. E. (2007). SARS news coverage and its determinants in China and the US. *Gazette*, *69*(6), 509–524. doi:10.1177/1748048507082839

Beck, U. (2007). *Weltrisikogesellschaft*. Frankfurt am Main: Suhrkamp.

Benesch, S. (1998). The rise of solutions journalism. *Columbia Journalism Review*, *36*(6), 36–39.

Bird, S. E., & Dardenne, R. W. (1988). Myth, chronicle, and story: Exploring the narrative qualities of news. In J. W. Carey (Ed.), *Media, myths, and narratives: television and the press* (Vol. 15, pp. 67–86). Thousand Oaks, CA: Sage.

*Buus, S., & Olsson, E.-K. (2006). The SARS crisis: was anybody responsible? *Journal of Contingencies & Crisis Management*, *14*(2), 71–81. doi:10.1111/jccm.2006.14.issue-2

Cacciatore, M. A., Scheufele, D. A., & Iyengar, S. (2015). The end of framing as we know it … and the future of media effects. *Mass Communication and Society*, *19*(1), 7–23. doi:10.1080/15205436.2015.1068811

*Chang, C. (2012). News coverage of health-related issues and its impacts on perceptions: Taiwan as an Example. *Health Communication*, *27*(2), 111–123. doi:10.1080/10410236.2011.569004

*Claassen, L., Smid, T., Woudenberg, F., & Timmermans, D. R. (2012). Media coverage on electromagnetic fields and health: Content analysis of Dutch newspaper articles and websites. *Health, Risk & Society*, *14*(7/8), 681–696. doi:10.1080/13698575.2012.716820

*Clarke, J. N., & Binns, J. (2006). The portrayal of heart disease in mass print magazines 1991-2001. *Health Communication*, *19*(1), 39–48. doi:10.1207/s15327027hc1901_5

*Clarke, J. N., & Everest, M. M. (2006). Cancer in the mass print media: Fear, uncertainty and the medical model. *Social Science & Medicine*, *62*, 2591–2600. doi:10.1016/j.socscimed.2005.11.021

Coleman, R., & Wu, H. D. (2015). *Image and Emotion in Voter Decisions. The Affect Agenda*. Lanham, MD: Lexington Books.

Dan, V. (2018). *Integrative Framing Analysis: Framing Health through Words and Visuals*. New York: Routledge.

David, C. C., Atun, J. M., Fille, E., & Monterola, C. (2011). Finding frames: comparing two methods of frame analysis. *Communication Methods and Measures*, *5*(4), 329–351. doi:10.1080/19312458.2011.624873

*De Brún, A., McKenzie, K., McCarthy, M., & McGloin, A. (2012). The emergence and portrayal of obesity in the Irish times: Content analysis of obesity coverage, 1997–2009. *Health Communication*, *27*(4), 389–398. doi:10.1080/10410236.2011.592627

*Driedger, S. M., Jardine, C. G., Boyd, A. D., & Mistry, B. (2009). Do the first 10 days equal a year? Comparing two Canadian public health risk events using the national media. *Health, Risk & Society*, *11*(1), 39–53. doi:10.1080/13698570802537011

*Dudo, A. D., Michael, F. D., & Dominique, B. (2007). Reporting a potential pandemic: A risk-related assessment of avian influenza coverage in U.S. newspapers. *Science Communication*, *28*(4), 429–454. doi:10.1177/1075547007302211

Entman, R. M. (1993). Framing: Toward clarification of a fractured paradigm. *Journal of Communication*, *43*(4), 51–58. doi:10.1111/j.1460-2466.1993.tb01304.x

Entman, R. M. (2004). *Projections of Power: Framing News, Public Opinion, and U.S. Foreign Policy*. Chicago, IL: University of Chicago Press.

Entman, R. M., Matthes, J., & Pellicano, L. (2008). Nature, sources and effects of news framing. In K. Wahl-Jorgensen & T. Hanitzsch (Eds.), *The Handbook of Journalism Studies* (pp. 175–190). New York, NY: Routledge.

Fagerlin, A., Peters, E., Schwartz, A., & Zikmund-Fisher, B. J. (2011). Cognitive and affective influences on health decisions. In J. M. Suls, K. W. Davidson, & R. M. Kaplan (Eds.), *Handbook of Health Psychology and Behavioral Medicine* (pp. 49–63). New York, NY: Guilford Press.

Graber, D. A. (1989). Content and meaning: "What's It All About?". *American Behavioral Scientist*, *33*(2), 144–152. doi:10.1177/0002764289033002004

Gronbeck, B. E. (1996). The presidency in the age of secondary orality. In M. J. Medhurst (Ed.), *Beyond the Rhetorical Presidency* (pp. 30–49). College Station: Texas A&M University Press.

*Haigh, M. M. (2012). health most common frame for spinach, peanut recalls. *Newspaper Research Journal*, *33*(3), 62–75. doi:10.1177/073953291203300305

Heffernan, C., Misturelli, F., & Thomson, K. (2011). The representation of highly pathogenic avian influenza in the Chinese media. *Health, Risk & Society*, *13*(7–8), 603–620. doi:10.1080/13698575.2011.630719

Hertog, J. K., & McLeod, D. (2001). A multiperspectival approach to framing analysis: A field guide. In S. D. Reese, O. H. Gandy, & A. Grant (Eds.), *Framing public life: Perspectives on media and our understanding of the social world* (pp. 139–161). Mahwah, NJ: Lawrence Erlbaum.

*Higgins, J. W., Naylor, P. J., Berry, T., O'Connor, B., & McLean, D. (2006). The health buck stops where? Thematic framing of health discourse to understand the context for CVD prevention. *Journal of Health Communication*, *11*(3), 343–358. doi:10.1080/10810730600614110

*Holland, K. E., Blood, R. W., Thomas, S. I., Lewis, S., Komesaroff, P. A., & Castle, D. J. (2011). Our girth is plain to see': An analysis of newspaper coverage of Australia's Future 'Fat Bomb. *Health, Risk & Society*, *13*(1), 31–46. doi:10.1080/13698575.2010.540648

*Holton, A., Weberling, B., Clarke, C., & Smith, M. (2012). The blame frame: Media attribution of blame during the MMR-autism vaccination scare. *Health Communication*, *27*, 690–701. doi:10.1080/10410236.2011.633158

*Hong, T. (2007). information control in time of crisis: the framing of SARS in China-based newspapers and internet sources. *CyberPsychology & Behavior*, *10*(5), 696–699. doi:10.1089/cpb.2007.9968

*Hove, T., Paek, H.-J., Yun, M., & Jwa, B. (2015). How newspapers represent environmental risk: the case of carcinogenic hazards in South Korea. *Journal of Risk Research*, *18*(10), 1320–1336. doi:10.1080/13669877.2014.923025

*Hurley, R., Sangalang, A., & Muddimann, A. (2009). *"Googling" Cancer: News Aggregation's Impact on Article Overlap, Frame, and Fear in Online Cancer News*. Paper presented at the annual meeting of the International Communication Association, Chicago, IL.

Iyengar, S. (1991). *Is anyone responsible? How television frames political issues*. Chicago: University of Chicago Press.

Jesson, J., Matheson, L., & Lacey, F. M. (2011). *Doing your literature review: Traditional and systematic techniques*. Thousand Oaks: Sage.

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, *47*(2), 263–292. doi:10.2307/1914185

Karpf, A. (1988). *Doctoring the Media*. London, UK: Routledge.

Kasperson, J. X., Kasperson, R. E., Pidgeon, N., & Slovic, P. (2003). The social amplification of risk: Assessing fifteen years of research and theory. In N. Pidgeon, R. E. Kasperson, & P. Slovic (Eds.), *The social amplification of risk* (pp. 13–46). Cambridge, England: Cambridge University Press.

Kitzinger, J. (1999). Researching risk and the media. *Health, Risk & Society*, *1*(1), 55–69. doi:10.1080/13698579908407007

Kitzinger, J., & Reilly, J. (1997). The rise and fall of risk reporting. *European Journal of Communication*, *12*(3), 319–350. doi:10.1177/0267323197012003002

Krippendorff, K. H. (2018). *Content analysis: An introduction to its methodologies*. Thousand Oaks, CA: Sage.

Krishnatray, P., & Gadekar, R. (2014). Construction of death in H1N1 news in The Times of India. *Journalism*, *15*(6), 731–753. doi:10.1177/1464884913496497

*Kuttschreuter, M., Gutteling, J. M., & de Hond, M. (2011). Framing and tone-of-voice of disaster media coverage: The aftermath of the Enschede fireworks disaster in the Netherlands. *Health, Risk & Society*, *13*(3), 201–220. doi:10.1080/13698575.2011.558620

*Lawrence, R. G. (2004). Framing obesity: The evolution of news discourse on a public health issue. *Harvard International Journal of Press and Politics*, *9*, 56–75. doi:10.1177/1081180X04266581

*Lee, S. T. (2014). Predictors of H1N1 Influenza pandemic news coverage: Explicating the relationships between framing and news release selection. *International Journal of Strategic Communication*, *8*(4), 294–310. doi:10.1080/1553118X.2014.913596

*Lee, S. T., & Basnyat, I. (2012). From press release to news: Mapping the framing of the 2009 H1N1 A influenza pandemic. *Health Communication*, *28*(2), 119–132. doi:10.1080/10410236.2012.658550

Leiss, W. (2001). Dioxins, or chemical stigma. In J. Flynn, P. Slovic, & H. Kunreuther (Eds.), *Risk, media and stigma: understanding public challenges to modern science and technology* (pp. 257–267). Sterling: Earthscan.

Levin, I. P., Schneider, S. L., & Gaeth, G. J. (1998). All frames are not created equal: A typology and critical analysis of framing effects. *Organizational Behavior and Human Decision Processes*, *76*(2), 149–188.

*Luther, C. A., & Xiang, Z. (2005). Within the boundaries of politics: News framing of SARS in China and the United States. *Journalism & Mass Communication Quarterly*, *82*(4), 857–872. doi:10.1177/107769900508200407

Matthes, J. (2009). what's in a frame? a content analysis of media framing studies in the world's leading communication journals, 1990-2005. *Journalism & Mass Communication Quarterly*, *86*(2), 349–367. doi:10.1177/107769900908600206

Matthes, J., & Kohring, M. (2008). The content analysis of media frames: Toward improving reliability and validity. *Journal of Communication*, *58*(2), 258–279. doi:10.1111/jcom.2008.58.issue-2

Mayring, P. (2002). *Qualitative Inhaltsanalyse. Grundlagen und Techniken* [Qualitative content analysis. Basics and techniques] (8th ed.). Weinheim, Germany: Beltz.

McCarthy, M., Brennan, M., Boera, M. D., & Ritson, C. (2008). Media risk communication – what was said by whom and how was it interpreted. *Journal of Risk Research*, *11*(3), 375–394. doi:10.1080/13669870701566599

*Mistry, B., & Driedger, S. M. (2012). Do the leads tell the whole story? An analysis of story leads of the Walkerton, Ontario *E. coli* contamination of drinking water supplies. *Health, Risk & Society*, *14*(6), 583–603. doi:10.1080/13698575.2012.701275

Nelkin, D. (1995). *Selling science: How the press covers science and technology*. New York: Freeman.

Nisbet, M. C. (2010). framing science: a new paradigm in public engagement. In L. Kahlor & P. Stout (Eds.), *Communicating Science: New Agendas in Communication* (pp. 40–67). New York: Routledge.

Oh, D. C., & Zhou, W. (2012). Framing SARS: A case study in Toronto of a mainstream newspaper and a Chinese ethnic newspaper. *Atlantic Journal of Communication*, *20*(5), 261–273. doi:10.1080/15456870.2012.728113

*Oh, J. H., Hove, T., Paek, H.-J., Lee, B., Lee, H., & Kyu Song, S. (2012). Attention cycles and the H1N1 pandemic: A cross-national study of US and Korean newspaper coverage. *Asian Journal of Communication*, *22*(2), 214–232. doi:10.1080/01292986.2011.642395

Olowokure, B., Odedere, O., Elliot, A. J., Awofisayo, A., Smit, E., Fleming, A., & Osman, H. (2012). Volume of print media coverage and diagnostic testing for influenza A(H1N1)pdm09 virus during the early phase of the 2009 pandemic. *Journal of Clinical Virology*, *55*(1), 75–78. doi:10.1016/j.jcv.2012.05.013

*Peng, W., & Tang, L. (2010). Health content in Chinese newspapers. *Journal of Health Communication*, *15*(7), 695–711. doi:10.1080/10810730.2010.514028

Petticrew, M., & Roberts, H. (2005). *Systematic reviews in the social sciences: A practical guide*. Malden, MA: Blackwell.

*Pickle, K., Quinn, S. C., & Brown, J. D. (2002). HIV/AIDS coverage in black newspapers, 1991-1996: Implications for health communication and health education. *Journal of Health Communication*, *7*(5), 427–444. doi:10.1080/10810730290001792

Pope, C., Mays, N., & Popay, J. (2007). *Synthesizing qualitative and quantitative health evidence*. London, UK: Open University Press.

*Pratt, C. B., Ha, L., & Pratt, C. A. (2002). Setting the public health agenda on major diseases in sub-Saharan Africa: African popular magazines and medical journals, 1981-1997. *Journal of Communication*, *52*(4), 889–904.

*Raupp, J. (2014). Social agents and news media as risk amplifiers: A case study on the public debate about the *E. coli* outbreak in Germany 2011. *Health, Risk & Society*, *16*(6), 565–579. doi:10.1080/13698575.2014.950203

Reed, R. (2001). (Un-)Professional discourse? *Journalism*, *2*, 279–298. doi:10.1177/146488490100200310

Reese, S. D. (2001). Prologue – framing public life: A bridging model for media research. In S. D. Reese, O. H. Gandy, & A. E. Grant (Eds.), *Framing Public Life: Perspectives on Media and Our Understanding of the Social World* (pp. 7–30). Mahwah, NJ: Erlbaum.

Rowe, G. (2000). Newspaper reporting of hazards in the UK and Sweden. *Public Understanding of Science*, *9*, 59–78. doi:10.1088/0963-6625/9/1/304

Schudson, M. (2003). *The Sociology of News*. New York, NY: Norton.

Schünemann, S. (2013). Science journalism. In B. Turner & R. Orange (Eds.), *Specialist Journalism* (pp. 134–146). New York: Routledge.

Semetko, H. A., & Valkenburg, P. M. (2000). Framing European politics: A content analysis of press and television news. *Journal of Communication*, *50*(2), 93–109. doi:10.1111/j.1460-2466.2000.tb02843.x

*Shih, T.-J., Wijaya, R., & Brossard, D. (2008). media coverage of public health epidemics: Linking framing and issue attention cycle toward an integrated theory of print news coverage of epidemics. *Mass Communication & Society*, *11*(2), 141–160. doi:10.1080/15205430701668121

*Siu, W. (2008). News discourses of avian flu influenza virus. *Journal of Communications Research*, *1*(4), 309–325.

*Stefanik-Sidener, K. (2013). Nature, nurture, or that fast food hamburger: Media framing of diabetes in the New York Times from 2000 to 2010. *Health Communication*, *28*(4), 351–358. doi:10.1080/10410236.2012.688187

Strekalova, Y. A. (2015). Informing dissemination research: A content analysis of U.S. newspaper coverage of medical nanotechnology news. *Science Communication*, *37*(2), 151–172. doi:10.1177/1075547014555025

Turner, M. M., Skubisz, C., & Rimal, R. N. (2011). *The Routledge Handbook of Health Communication*. In T. L. Thompson, R. Parrott, & J. F. Nussbaum (Eds.), Theory and practice

in risk communication. A review of the literature and visions for the future (pp. 146–160). New York: Routledge.

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, *185*, 1124–1131. doi:10.1126/science.185.4157.1124

Uman, L. S. (2011). Systematic reviews and meta-analyses. *Journal of the Canadian Academy of Child and Adolescent Psychiatry*, *20*(1), 57–59.

Van Gorp, B. (2007). The constructionist approach to framing: Bringing culture back in. *Journal of Communication*, *57*(1), 60–78..

*Wang, W., Smith, R., & Worawongs, W. (2010). *Googling the H1N1 Flu: Investigating Media Frames in Online News Coverage of the Flu Pandemic*. Paper presented at the 2010 Annual Meeting of the International Communication Association.

Waters, E. A., McQueen, A., & Cameron, L. D. (2013). perceived risk and its relationship to health-related decisions and behavior. In L. R. Martin & M. R. DiMatteo (Eds.), *The Oxford Handbook of Health Communication, Behavior Change, and Treatment Adherence* (pp. 193–213). Oxford, UK: Oxford University Press.

*Weaver, D. A., Lively, E., & Bimber, B. (2009). searching for a frame: news media tell the story of technological progress, risk, and regulation. *Science Communication*, *31*(2), 139–166. doi:10.1177/1075547009340345

Weiner, B. (1993). AIDS from an attributional perspective. In J. B. Pryor & G. D. Reeder (Eds.), *The social psychology of HIV infection* (pp. 287–302). Hillsdale, NJ: Lawrence Erlbaum Associates.

Yanovitzky, I. (2002). Effects of news coverage on policy attention and actions: A closer look into the media-policy connection. *Communication Research*, *29*(4), 422–451. doi:10.1177/0093650202029004003